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EXAMINER
SANTOS, PATRICK J D

ART UNIT	PAPER NUMBER
2171	11

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/726,023	LABELLE, LILIAN	
	Examiner	Art Unit	
	Patrick J Santos	2171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 November 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *30 November 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4-6,9 dt 4/01,5/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1 and 10-13 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,893,095 issued to Jain et al. (hereafter Jain '095).

Claim 1:

Regarding Claim 1, Jain '095 discloses a content based image query engine. Specifically, Jain '095 discloses: a method of seeking images, from an example image, from amongst a plurality of images stored in a database, each of the stored images being associated with a data item of a first type, referred to as an index of the stored image, representing at least one characteristic of the visual content of the image (Jain '095: Abstract; col. 3, ln. 58 to col. 4, ln. 4), said method comprising the following steps:

- receiving a data item of a second type representing the location of at least one region of interest in the example image (Jain '095: col. 4, lns. 21-28; col. 35, lns. 17-18);

- for each region of interest, ROI_r, receiving a data item of a third type, V_r, indicative of a type of taking into account of the content of the said region of interest for the seeking of images (Jain '095: col. 8, lns. 6-15);
- calculating a data item of a fourth type, referred to as the index of the example image, representing at least one characteristic of the visual content of the example image, the method of calculating said data item of the fourth type depending on said data item of the second type and said data items of the third type (Jain '095: col. 8, lns. 17-20, note that a primitive may be a composite function);
- calculating a similarity between the example image and each of the images amongst at least one subset of the stored images, said similarity being calculated from said data item of the first type associated with the stored image and the data item of the fourth type associated with the example image (Jain '095: col. 8, lns. 20-35; col. 7, lns. 9-23); and
- supplying at least one image, referred to as the result image, in the database, said at least one result image being selected from amongst said stored images in the database according to its degree of similarity with said example image (Jain '095: col. 9, ln. 64 to col. 10. ln. 10).

Claim 3:

Regarding Claim 3, Jain '095 discloses all the limitations of Claim 1 (supra). Further note that Jain '095 additionally discloses: wherein said data item of the first type, called index of the stored image, associated with each of said stored images, consists of a histogram, of colors relating to the global content of the image (Jain '095: col. 7, lns. 50-53).

Claim 10:

Regarding Claim 10, Jain '095 discloses all the limitations of Claims 1 (supra). Further note that Jain '095 additionally discloses: said data item of the second type representing the location of at least one region of interest in the example image consists of a set of two-dimensional points indicative of the shape of said at least one region of interest and its location in the image plane of said example image (Jain '095: col. 35, lns. 17-18 – note that an image is two-dimensional and specifying a "portion of the image" as per Jain '095 includes indicating the shape and location of a region of interest).

Claim 11:

Regarding Claim 11, Jain '095 discloses the method of Claim 1 (supra). Further note that Jain '095 additionally discloses the device embodiment of said methods (Jain '095: col. 10, lns. 11-40).

Claim 12:

Regarding Claim 12, Jain '095 discloses the method of Claim 1 (supra). Further note that Jain '095 additionally discloses a computer comprising means embodiment of said methods (Jain '095: col. 10, lns. 11-40).

Claim 13:

Regarding Claim 13, Jain '095 discloses disclose all the limitations of Claim 11 (supra). Further note that Jain '095 additionally discloses the computer embodiment of Claim 11 (Jain '095: col. 10, lns. 11-40).

3. Claims 1, 3, and 10-13 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,373,979 issued to Wang (hereafter Wang '979).

Claim 1:

Regarding Claim 1, Wang '979 discloses a content based image query engine. Specifically, Wang '979 discloses: a method of seeking images, from an example image, from amongst a plurality of images stored in a database, each of the stored images being associated with a data item of a first type, referred to as an index of the stored image, representing at least one characteristic of the visual content of the image (Wang '979: Abstract, Fig. 5, Fig. 8A, col. 7, lns. 10-12), said method comprising the following steps:

- receiving a data item of a second type representing the location of at least one region of interest in the example image (Wang '979: col. 4, lns. 27-32);
- for each region of interest, ROI_r, receiving a data item of a third type, V_r, indicative of a type of taking into account of the content of the said region of interest for the seeking of images (Wang '979: col. 4, lns. 44-46);
- calculating a data item of a fourth type, referred to as the index of the example image, representing at least one characteristic of the visual content of the example image, the method of calculating said data item of the fourth type depending on said data item of the second type and said data items of the third type (Wang '979: col. 5, lns. 6-20, note the weighted similarity function);
- calculating a similarity between the example image and each of the images amongst at least one subset of the stored images, said similarity being calculated from said data item of the first type associated with the stored image and the data item of the fourth type associated with the example image (Wang '979: col. 5, lns. 22-30); and

- supplying at least one image, referred to as the result image, in the database, said at least one result image being selected from amongst said stored images in the database according to its degree of similarity with said example image (Wang '979: Fig. 8A, col. 7, lns. 21-23).

Claim 3:

Regarding Claim 3, Wang '979 discloses all the limitations of Claim 1 (supra). Further note that Wang '979 additionally discloses: wherein said data item of the first type, called index of the stored image, associated with each of said stored images, consists of a histogram, of colors relating to the global content of the image (Wang '979: col. 4, lns. 44-45).

Claim 10:

Regarding Claim 10, Wang '979 discloses all the limitations of Claims 1 (supra). Further note that Wang '979 additionally discloses: said data item of the second type representing the location of at least one region of interest in the example image consists of a set of two-dimensional points indicative of the shape of said at least one region of interest and its location in the image plane of said example image (Wang '979: col. 4, lns. 27-36 - note that an image is two-dimensional and specifying the "attributes of the segments" as per Wang '979 reads on the shape and location of a region of interest).

Claim 11:

Regarding Claim 11, Wang '979 discloses the method of Claims 1 and 2 (supra). Further note that Wang '979 additionally discloses the device embodiment of said methods (Wang '979: col. 9, lns. 4-10).

Claim 12:

Regarding Claim 12, Wang '979 discloses the method of Claims 1 and 2 (supra). Further note that Wang '979 additionally discloses a computer comprising means embodiment of said methods (Wang '979: col. 9, lns. 4-10).

Claim 13:

Regarding Claim 13, Wang '979 discloses disclose all the limitations of Claim 11 (supra). Further note that Wang '979 additionally discloses the computer embodiment of Claim 11 (Wang '979: col. 9, lns. 4-10).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wang '979 in view of U.S. Patent No. 6,230,154 issued to Raz et al. (hereafter Raz '154).

Claim 2:

Regarding Claim 2, Wang '979 discloses all the limitations of Claim 1 (supra). Further note that Wang '979 additionally discloses: wherein said data item of the third type V_r, associated with a region of interest ROI_r, is a scalar data item which can take all the values lying between a predefined lower value V_{min}, and a predefined higher value V_{max}, (Wang '979: col. 5, lns. 22-39) and wherein:

- if said data item of the third type V, is equal to the predefined lower value V_{min}, the content of the images sought must not be similar to the content of the corresponding region of interest ROI_r (Wang '979: col. 5, lns. 29-33); and
- if said data item of the third type V_r, is equal to the predefined higher value V_{max}, the content of the images sought must be similar to the content of the corresponding region of interest ROI_r (Wang '979: col. 5, lns. 27-31).

However, Wang '979 does not explicitly disclose:

- if said data item of the third type V_r, lies strictly between the lower predefined value V_{min} and the higher predefined value V_{max}, the content of the images sought must be more or less similar to that of the corresponding region of interest ROI_r depending on whether the value of V_r, is close to V_{max} or is close to V_{min}, the overall content of the example image also having to be taken into consideration.

Raz '154 discloses a hyperbox that defines whether a retrieved item is similar. Specifically, Raz '154 discloses:

- if said data item of the third type V_r, lies strictly between the lower predefined value V_{min} and the higher predefined value V_{max}, the content of the images sought must be more or less similar to that of the corresponding region of interest ROI_r depending on whether the value of V_r, is close to V_{max} or is close to V_{min}, the overall content of the example image also having to be taken into consideration (Raz '154: lns. 14-27).

It would have been obvious to a person having ordinary skill in the art to augment the similarity criteria of Wang '979 with the hyperbox of Raz '154. The motivation to accomplish said augmentation is suggested by Raz '154 which discloses that applying the hyperbox of Raz

'154 provides a particularly advantageous way to view and conceptualize similarity relationships between database items (Raz '154: col. 3, lns. 23-38).

6. Claims 3-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang '979 and Raz '154, in view of Jain '095.

Claim 4:

Regarding Claim 4, Wang '979 and Raz '154 in combination disclose all the limitations of Claim 3 (supra). Further note that Wang '979 and Raz '154 in combination additionally disclose that a condition can be set for:

- if all said data items of the third type are equal to said lower predefined value V_{min}, or if all said data of the third type are equal to said higher predefined value V_{max}; or
- if each of said data of the third type is equal to V_{min} or equal to V_{max} (Raz '154: lns. 14-27 – note the hyperbox of Raz '154 reads on this range setting)

However, Wang '979 and Raz '154 in combination do not explicitly disclose that the action taken on the above condition is:

- said step of calculating a data item of a fourth type, called index of the example image, includes a step of calculating a vector, ($G_R(Q)$), each component of which consists of the histogram of colors representing the visual content of one of said regions of interest, said vector constituting the index of said example image.

  Jain '095 discloses:

- said step of calculating a data item of a fourth type, called index of the example image, includes a step of calculating a vector, ($G_R(Q)$), each component of which consists of the

histogram of colors representing the visual content of one of said regions of interest, said vector constituting the index of said example image (Jain '095: col. 8, lns. 32-34 – note that the composite metric of Jain '095 reads on the index of Applicant).

It would have been obvious to a person having ordinary skill in the art to set the composite metric of Jain '095 for the condition of Wang '979 and Raz '154 in combination. The motivation to accomplish said setting is suggested by Jain '095 which discloses the necessity of combining into a composite metric different distance metric components of multiple primitives (i.e. computed statistical features of an image) (Jain '095: col. 8, lns. 29-34).

Claim 5:

Regarding Claim 5, Wang '979, Raz '154, and Jain '095 in combination disclose all the limitations of Claim 4 (supra). Further note that Wang '979, Raz '154, and Jain '095 in combination additionally discloses: wherein if all said data of the third type are strictly between said lower predefined value V_{min} and said higher predefined value V_{max}, then said step of calculating a data item of a fourth type, called index of the example image (Raz '154: lns. 14-27 and Jain '095: col. 8, lns. 29-34), includes the following steps:

- calculating a matrix (W) with M rows and M columns, where M is a integer number designating the number of colors available, each element of whose diagonal corresponds to one of the M colors available, each of the elements of the diagonal having a value which is calculated as a function of the dominant character of the color associated with said element in said at least one region of interest associated with said example image, and of said data item of the third type associated with said at least one region of interest (Wang '979: col. 4, ln. 62 to col. 5, ln. 20 – note the "weighting matrix" of Wang '979);

- calculating the histogram of colors ($H_M(Q)$) representing the overall visual content of said example image (Q) (Wang '979: col. 4, ln. 62 to col. 5, ln. 20 – note the multiplication of the "weighting matrix" with the "histograms representing the color characteristics" of Wang '979);
- defining said index of the example image (Q) as being the result (X(Q)) of the product of said matrix (W) and said histogram of colors (H_MQ)) representing the overall visual content of said example image (Q) (Wang '979: col. 4, ln. 62 to col. 5, ln. 20 – note the use of the multiplication of the "weighting matrix" with the "histograms representing the color characteristics" for a "weighted similarity function" of Wang '979).

Claim 6:

Regarding Claim 6, Wang '979, Raz '154, and Jain '095 in combination disclose all the limitations of Claim 5 (supra). Further note that Wang '979, Raz '154, and Jain '095 in combination additionally disclose: when said data of the third type are not all equal to said lower predefined value V_{min}, and are also not all equal to said higher predefined value V_{max}, and are also not each equal either to V_{min} or to V_{max}, and also not all strictly between V_{min} and V_{max} (Raz '154: lns. 14-27 – note the hyperbox of Raz '154), said index of the example image consists of the result (X(Q)) of the product of said matrix (W) and said histogram of colors ($H_M(Q)$) representing the overall visual content of said example image (Q), and of said vector, ($G_R(Q)$) (Wang '979: col. 4, ln. 62 to col. 5, ln. 20 – see discusion in Claim 5 (supra)), each component of which consists of the histogram of colors representing the visual content of one of said regions of interest (Wang '979: col. 5, lns. 4-5; col. 4, lns. 28-32 – note the "segments" of Wang '979 read on regions of interest).

Claims 7-9:

Regarding Claims 7-9, Wang '979, Raz '154, and Jain '095 in combination disclose all the limitations of Claim 6 (supra). Further note that Wang '979, Raz '154, and Jain '095 in combination additionally disclose:

- (Claim 7) said step of calculating a similarity between the example image and each of the images amongst at least one subset of the stored images, includes the step of calculating a similarity, denoted SIM_1, obtained by means of the following formula:

$$SIM_1(D) = Max\ [\ H_M(D) \cap H_M\ (ROI_r^{S0})\ ]$$

in which $H_M(D)$ designates a histogram of colors calculated for the stored image under consideration; ROI_r^{S0} designates any region of interest in the example image for which the associated data item of the third type V_r, is equal to V_{min}; $H_M\ (ROI_r^{S0})$ designates a histogram of colors calculated for this region of interest; the operator $\cap$ designates the intersection operation between histograms; and the function *Max* takes the largest value obtained by these intersections (Wang '979: col. 7, ln. 24 to col. 8, ln. 18).

- (Claim 8) said step of calculating a similarity between the example image and each of the images amongst at least one subset of the stored images, includes the step of calculating a similarity, denoted SIM_2, obtained by means of the following formula:

$$SIM_2(D) = Max\ [\ H_M(D) \cap H_M\ (ROI_r^{S1})\ ]$$

in which $H_M(D)$ designates a histogram of colors calculated for the stored image under consideration; ROI_r^{S0} designates any region of interest in the example image for which the associated data item of the third type V_r, is equal to V_{max}; $H_M\ (ROI_r^{S1})$ designates a

histogram of colors calculated for this region of interest; the operator ∩ designates the intersection operation between histograms; and the function *Max* takes the largest value obtained by these intersections (Wang '979: col. 7, ln. 24 to col. 8, ln. 18).

- (Claim 9) said step of calculating a similarity between the example image and each of the images amongst at least one subset of the stored images includes the step of calculating a similarity, denoted SIM_3, obtained by means of the following formula:

$$SIM_3(D) = H_M(D) \cap X(Q) \quad with \; X(Q) = W \circ H_M(Q)$$

in which $H_M(D)$ designates a histogram of colors calculated for the stored image under consideration; W designates said matrix; $H_M(Q)$ is a histogram of colors representing the global visual content of said example image (Q); and the operator n designates the intersection operation between histograms (Wang '979: col. 7, ln. 24 to col. 8, ln. 18).

Note that the combination of Wang '979, Raz '154, and Jain '095 provide for use of appropriate similarity function as required by the user (Wang '979: col. 7, ln. 32 and Jain '095: col. 8, lns. 20-55) and moreover provide for the elements to calculate the similarity function and conditions for the similarity functions of Claims 7-9. A person having ordinary skill in the art, faced with the problem of creating an appropriate similarity function as applicable per Claims 7-9 would reasonably expected to infer the similarity functions as per Claims 7-9 (see MPEP 2144.01).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

- U.S. Patent No. 5,579,471 issued to Barber et al., "Image Query System and Method." Reference is the basic QBIC (query based on image content) patent.
- U.S. Patent No. 6,285,995 issued to Abdel-Mottaleb et al., "Image Retrieval System Using a Query Image." Reference provides another alternative base QBIC patent that uses color histograms.
- U.S. Patent No. 6,446,060 issued to Bergman et al., "System and Method for Sequential Processing for Content-Based Retrieval of Composite Objects." Reference teaches an alternative way to make a query from smaller subqueries. Subqueries read on individual regions of interest.
- U.S. Patent No. 5,963,670 issued to Lipson et al., "Method and Apparatus for Classifying and Identifying Images." Reference discloses the definition of a region of interest via 2-dim points (col. 2, ln. 56 to col. 3, ln. 18; col. 2, lns. 9-16).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick J.D Santos whose telephone number is 703-305-0707. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on 703-308-1436. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Patrick J.D. Santos
May 13, 2004

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